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GENERAL INFORMATION

OCTOBER 1958

SOIL CONSERVATION

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SOIL CONSERVATION

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★ THIS MONTH ★

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TOM DALE, Editor

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THE HUGH BENNETT CUP.—In São Paulo, large and prosperous Brazilian state, Soil Conservation Day has been established by state decree to coincide with the birthday of Hugh Hammond Bennett, former Chief of SCS, whom the Brazilians call the "Father of Soil Conservation." On April 15th, every year, special programs and appropriate festivities mark the day, with educational lectures, displays, banquets, and announcements of work accomplished on the land and the next year's goals.

Presentation of the *taça Hugh Bennett*—the Hugh Bennett Cup—was an important feature of São Paulo's Soil Conservation Day in 1958. *Folha da Manhã*, one of Brazil's outstanding newspapers, received the award for its carefully conducted conservation-education campaign through 1957.

Bennett was Chief of the Soil Conservation Service from the time of its establishment in the U. S. Department of Agriculture in 1935 to his retirement in 1952. He now devotes his time to writing, lecturing, research, study, and consultation with foreign governments on soil- and water-conservation problems.

Editors are invited to reprint material originating in this magazine.



FRONT COVER.—A farm pond in Vermont that supplies stockwater, fire protection, and recreation.

Photo by Gordon S. Smith.

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Controlling A Spring Fed Gully

By ERNEST A. CHRISTIE

ONE of the most difficult conservation jobs is to establish a grass waterway where constantly running water is cutting a gully. Elmer Barr, a cooperator, with the Brown County Soil Conservation District, is solving this problem by using reed canarygrass. An outstanding feature of reed canarygrass is that it can develop roots from the nodes of stems and grow while submerged in water. Barr takes advantage of this feature to control an active gully and establish a grassed waterway on his farm north of Hiawatha, Kans.

Mr. Barr's 80 acre farm is located in the Walnut Creek Watershed. A gully 1,000 feet long, 12 feet deep, and 30 feet wide was clogged with brush and trees. The gully drained about 220 acres, while a spring fed water into it the year around. Mr. Barr, working with local Soil Conservation Service technicians, decided to build an erosion control dam at the lower end of the gully and shape the upper portion into a waterway.

The erosion control dam was built, the brush removed, and the waterway shaped and seeded

to reed canarygrass in early spring. The running water prevented a stand of grass in the center of the channel and left it unprotected.

On June 28, 1957, Mr. Barr and local SCS technicians cut a supply of fresh green reed canarygrass hay on the farm of a neighbor, Maurice Cashman. The grass was cut with a small sickle bar mower and hauled to the waterway immediately after being cut. Once at the site the green hay was spread by hand and tramped into the mud.

The hay from about 1,500 square feet was used to cover an area of about 1 acre. The hay contained some mature seed. Tramping with bare feet was found to be superior to tramping with overshoes, much to the delight of Mr. Barr's two boys, Wayne 11 and Tommy 8, who helped with the tramping. It was somewhat difficult to get the hay anchored in the soft mud. As fast as one end of a stem was buried, the other end would pull out, but the job was finally completed.

A check of the area, 3 weeks after planting, showed new shoots developing from the joints of the old stems where the soil had re-

Note:—The author is a soil conservationist, Soil Conservation Service, Hiawatha, Kans.



Spreading green reed canarygrass hay and trampling it into the mud of a spring fed waterway. Erosion control dam with outlet is in left background.



Root and shoot development at joints of Reed canarygrass, 3 weeks after the hay was spread.

mained moist or where the stem was submerged in water. Some of the seeds had sprouted and were growing well. By October 10, these shoots had developed into husky young plants that were beginning to catch silt. The silt was causing the running water to spread and keep a larger area moist. The young reed canarygrass plants were beginning to spread into the moist area by rhizomes or underground stems. Within a year or two the gully will be healed, the pond below will have additional protection against silting, and there will be good cover for wildlife.

This method of establishing grass will not work in every case. The soil must stay wet



Inspecting well-developed Reed canarygrass plants in waterway, 3 months after hay was spread and trampled into soil

while the grass is becoming established, and a good source of vigorous healthy reed canarygrass for a supply of stems is essential. The stems must be spread soon after cutting. A considerable amount of hand labor is involved and the method may not be practical for large areas.

Upside-Down Land

Land Leveling Operations Required the Moving of Practically All the Soil on a Farm and Turning the Soil Upside Down in the Moving Process.

By G. B. SWIER

LAND leveling is an important and popular conservation practice in the Wapato Soil Conservation District of central Washington. But few farm owners have done such a thorough job of face-lifting in their leveling operations as have Wilfred Hall and Herbert Harmon. They have literally transformed an 80-acre farm from a rocky, hard-to-irrigate piece of ground to a productive farm, with controlled irrigation grades, and in addition have created a wildlife area.

During the summer of 1957, Hall and his partner Harmon bought this farm unit for \$20,000. They requested assistance from the Wapato Soil Conservation District to "level" the land—including excavating and burying gravel bars—so as to have a minimum of 18 inches of topsoil over the farm when the job was completed.

SCS technicians did the survey work and established grade stakes. The soil is Naches sandy loam, old alluvium river terrace, with gravel occurring at every depth from the sur-

Note:—The author is work unit conservationist, Soil Conservation Service, Toppenish, Wash.

face to 5 feet. The shallow soil is usually on the higher ridges, and the deep soils are found in the swales and sloughs. To assure 18 inches of topsoil it was necessary to remove soil from the swales and replace it with gravel, then re-cover the gravel-filled areas with topsoil.

On ridges where gravel was within 18 inches of grade, it was necessary to first remove and stockpile the good soil and remove the gravel to 18 inches below grade, then replace it with 18 inches of swale topsoil. This "trading" of soil for gravel changed the original soil to such an extent that 31 acres of poor land were reclassified and improved by several capability classes.

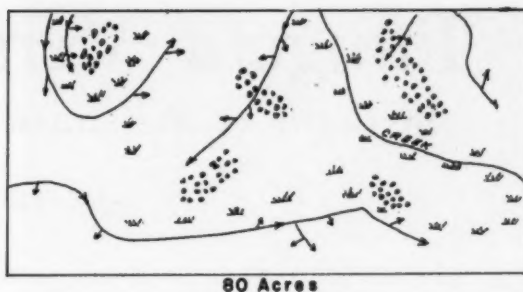
The contractor, George Bolton, soon worked out a system to exchange the good soil in the sloughs with gravel on the ridges. He established "haul-roads" to carry gravel to the slough and tillable soil to the ridges so that the finished job showed no surface gravel.

Two 50 horsepower crawler tractors, with 5-cubic yard carryall scrapers, and one 50 horsepower tractor, with an 8-cubic yard elevating-type scraper, were used. An estimated 125,000 cubic yards of material was moved, about 40 percent of which was gravel. About one-half of a mile of permanent road and one-half acre of farmyard were graveled in the process.

The irrigation system was designed for the use of siphon tubes and temporary open-head ditches with plastic dams. The design called for a finished irrigating grade of .25 percent and a side slope of .03 percent, with 660 foot runs on 3 fields, and 800 foot runs on the fourth field.

The "bonus" payment came from changing an unsightly 14 acres of permanent slough into 10 productive farm acres and an attractive 4-acre wildlife area. This area still provides drainage for the lands lying above, but it is now a natural habitat for pheasants, waterfowl, and fish. The old slough channel was straightened and narrowed by 'dozing gravel over the cattails and saving the topsoil for the reclaimed land. An artificial island was built at a wide place in the creek.

A permanent gravel road borders the wildlife area which gives easy access to all farm fields. The road crosses the creek at two places, where culverts are installed to regulate the depth of the water. Hundreds of sumac, elderberry, and

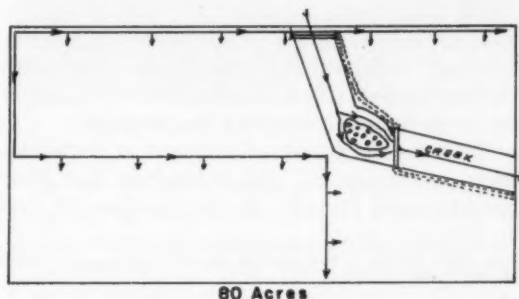


BEFORE DEVELOPMENT

45 Ac. Cropland Class I and II
17 Ac. Gravel Class IV
18 Ac. Sloughs Class VII

LEGEND

Gravel
Sloughs



AFTER DEVELOPMENT

76 Ac. Cropland Class I and II
4 Ac. Wildlife Area

cottonwood were removed to improve the site. Two small groves were thinned out and can be used for natural duck blinds.

The total cost for the improvement was \$12,000, in round figures. This, plus the original cost makes \$32,000 that Hall-Harmon have invested. They do not plan to sell this farm, but believe it should sell for \$60,000. In any event, the return on their improvements should pay out 3 to 1, gross crop tonnage should increase by 500 percent or more, while local tax valuation increased 400 percent. Hall and Harmon figure that the \$12 per acre ACP payment will offset the increase in local taxes for several years.

In the meantime Wilfred Hall and Herbert Harmon have a beautiful productive farm, and the contractor and SCS technicians have one more good reference for farmers and others to view.

Pangola Versus Hurricane

In Battle of the Grasses on the Virgin Islands.

By ALFRED H. OVESEN

HURRICANEGRASS, an unwelcome guest which has infested 16,000 acres of good pasture and cropland on the Island of St. Croix, V. I., appears to have met its match. It looks as if pangolagrass might effectively eradicate hurricanegrass, where other competing species have failed.

The Virgin Islands, and St. Croix especially, have always needed a grass capable of withstanding drought, that would compete with hurricanegrass (*Andropogon pertusa*), and at the same time furnish feed for livestock.

The common grasses, Guineagrass, bermudagrass, paragrass, St. Augustinegrass and Mexican bluestem, turn dry during the drought, and

animals are forced to eat weeds, trees, and even cactus.

Barbados sourgrass showed promise, but planting by seed was a risk in that seeds sometimes were not viable. Planting Barbados by clumps was too expensive, and growth was too slow in covering the ground.

In searching for a better competitor for hurricanegrass we found that a grass had been imported from Africa during the late 1930's and at that time was being tested by several agricultural stations in Florida. We thought we should try it on St. Croix.

Working with the Extension agent, the Soil Conservation Service secured enough propagation material of pangolagrass (*Digitaria decumbens*) to make several trial plantings. A

Note:—The author is conservation aid, Soil Conservation Service, St. Croix, V. I.



The block of pangolagrass in the foreground was planted in a field of hurricanegrass. It has almost completely eliminated the hurricanegrass, though hurricane still thrives in the background.

total of 24 small bundles weighing about 5 pounds was received in 1950 and planted in a prepared seedbed at Estate Anna's Hope.

Eight months after planting, the bed was completely covered with grass runners 5 to 8 feet in length. Its peculiar characteristic of pegging at the joints was noted and its tendency of fast coverage of the surrounding area showed promise.

It was decided that we should get some farmers to make field tests of this grass. Small amounts were distributed in various sections and on different types of soil.

Its growing habits and coverage were considered excellent. Interest in this grass became so widespread that farmers were taken to the several areas to observe growing conditions and the pasturage furnished to livestock.

Many of our farmers feel that pangolagrass, in the eradication of hurricanegrass, may not be the complete solution to the problem, but that it is the best grass now available to solve this weedy problem.

Tests have indicated that pangolagrass not only competes with the hurricanegrass, but eventually smothers it out. The tests also indicate that pangola will furnish more pasturage than any of the other grasses tested, and yields about 5 times as much pasturage as hurricane.

To give the pangolagrass as severe a trial as possible it was necessary to plant it on an area entirely surrounded by hurricanegrass. No land preparation, such as plowing or harrowing, was done. Instead, an area was selected in a solid hurricane pasture. A replicated complete block design was laid out. Each block was subsoiled, and pangolagrass, Barbados sourgrass, Guineagrass, and coastal bermudagrass were planted in the furrows left by the blade of the subsoiler. Solid areas or rows of hurricanegrass were left between furrows to observe the competition of the various grasses with hurricane.

Guineagrass did not increase. Instead, all blocks planted to Guineagrass became a solid area of hurricanegrass, with a few sickly clumps of Guinea remaining.

Barbados sourgrass has not shown any increase and remains the same as when planted. Coastal bermudagrass, after a while, showed the effects of the encroachment of the hurricanegrass.



Pangolagrass (*Digitaria decumbens*).

In all areas planted to pangolagrass, the pangola has completely covered the blocks and sent runners into adjoining blocks. In fact, the only green area seen in this hurricanegrass pasture, is the blocks of pangolagrass. There are a few blades of hurricanegrass showing in the pangola blocks, but we believe these will soon be smothered out.

Tests of field conditions in several pastures throughout the island, under severe conditions, have proved that this grass is actually compet-



A field formerly covered with Guineagrass has been completely covered with hurricanegrass. Light colored patches on hills in the background show that hurricanegrass is also taking over there.

ing with four important factors: (1) drought, (2) hurricanegrass, (3) overgrazing, and (4) aphids.

An aphid, *Sipha flava*, has been found to attack this grass under some conditions. It has attacked the older established sods more frequently than the younger sods. The observed damage has been negligible based on observations made at different seasons of the year on widely different soil and climatic conditions. A system of rotational grazing, allowing the grass to remain at heights of 8 inches or less, makes it difficult for the aphids to survive, due to winds, heat of the sun, insects, rain, and the trampling of the hoofs of the livestock.

From experiments, pangola was found to be more aggressive than coastal bermuda, and to control weeds better; although, coastal bermuda regrows faster after grazing than pangola does under similar conditions. On some fertilizer tests, pangola was found to be more responsive to fertilizer treatment than coastal bermuda and has produced higher yields when grown under similar conditions.

As an example of grazing capacity, one farmer planted 6 acres of pangolagrass. Good seed-

bed preparation was provided, consisting of 2 plowings, 2 harrowings, and subsoiling. Pangola was planted, using the clump or stool method in rows 2½ feet apart.

This field was in an area surrounded with hurricanegrass. The field planted in October 1955 made a complete cover by May 1956. Due to the farmer's not having enough pasturage his livestock, consisting of 19 head of cattle and 2 horses, were turned into this field. This 6-acre plot was his only source of feed up to December 1956. During January and February 1957, it was rested and allowed to rejuvenate. This farmer and others are proud of the performance pangola has given and the way it has reacted.

With the results shown by pangolagrass in its ability to not only survive and halt the encroachment of hurricanegrass, but eventually to smother out this undesirable species of grass, interest in pasture improvement has been accelerated. At the present time the agricultural station and farmers who have already established pangolagrass fields are assisting other interested farmers with planting material to establish their own propagation areas.

Pipelines May Be Hazardous

Pipeline Representatives, Earth Moving Contractors, and SCS Technicians Discuss Safety Measures for Land Improvement Operations Near Pipelines.

By JAMES W. McDOWELL

“WE can clean up the mess, but we cannot restore a human life,” stated Donald Bakewell, representative of the Platte Pipeline Co. He was speaking to a group of earth moving contractors and Soil Conservation Service technicians at a joint meeting of the two groups.

Bakewell continued, “Our line carries crude oil from Wyoming and western Nebraska oil fields to Illinois. A pressure of about 1,000 pounds per square inch is maintained, so you

can imagine the danger a person would be in if he should sever the line. In addition to the tremendous pressure there is the fire hazard. Our line is supposed to be a minimum of 36 inches underground at all points. However, you men don't need to be told that erosion may have reduced that in some places. Our line is marked at every section line, and on the marker is our address and phone number. Whenever you intend to build a pond, terrace, or level land near our line, we want you to call us collect so that we can take the necessary steps to insure your safety and our line.”

Note:—The author is work unit conservationist, Soil Conservation Service, Geneva, Nebr.

At the same meeting, Ralph Shirley, of the Kansas-Nebraska Natural Gas Co., expressed his appreciation for the cooperation of the SCS and contractor groups that resulted in the reduction of mishaps on the Kansas-Nebraska lines during the past year. He gave every one present a detailed map of the location of all gas pipelines in the area. His company fears mainly for the safety of individuals, although a line break is of no minor consequence to a gas company, either.

What these two men said, and the spirit of cooperativeness in the way they said it, was the theme of the entire SCS-contractor meetings. This was the second annual all-day meeting of this type held in south-central Nebraska. To accommodate the largest possible number of people, two sessions of the same meeting were held, one at Geneva, the other at Beatrice, Nebr.

J. Dexter Haws, area conservationist, Hebron, Nebr., states: "We started holding these meetings to bring a closer working relationship between our SCS people and the local land improvement contractors. These contractors often worked across county lines and found individual differences in the manner that SCS employees were doing business. These meetings have helped to develop uniform interpretations by our employees and have developed common understanding among the contractors and technicians. Our relations have certainly been strengthened."



Victor Schroeder of the Kansas-Nebraska Gas Company and Henry Gembala of SCS look at a marker that identifies the location of a gas pipeline.



Contractors and SCS technician show depth of cut and drainage ditch made in land leveling operations near Bruning, Nebr.

Occupying a large part of the program, as well as making the arrangements for the event, are Area Engineer Henry Gembala, Hebron, Nebr., and Assistant Area Engineer John Overing, York, Nebr. They go over the specifications for the various soil- and water-conservation practices used in the area so that no doubt can be left in anyone's mind as to what is expected. The Agricultural Stabilization and Conservation Committee gives a report on current ACP regulations.

Since land grading cuts sometimes exceed 4 feet in depth in this area, pipeline company representatives have been invited to these meetings to protect their interests.

The contractors are given a portion of the program to express their views. This year, two rival machinery sales companies teamed together and presented unbiased cost data of earth moving machinery operations.

Mr. Robert Keister, Geneva, Nebr., of the Keister-Walker Construction Co., had charge of the contractors' part of the 1958 meeting at Geneva. He had this to say: "This thing is getting bigger and better every year. I counted 21 different contractor organizations here today and I understand that about 40 firms were represented at Beatrice."

With the 1958 meetings over, contractors, SCS technicians, ASC, and pipeline company representatives are already gathering ideas to make the 1959 meetings even more successful.

HIGHWAY EROSION CONTROL IN NORTHWEST GEORGIA

No. 38

This is the thirty-eighth of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

By E. C. RICHARDSON, E. G. DISEKER,
and B. H. HENDRICKSON

WHEREVER modern highways are built through hilly country numerous cuts and fills are required. Both cuts and fills expose steep slopes of soil or subsoil where rapid runoff and high rates of erosion usually occur. Unless protected by vegetation they are a serious hazard to highway maintenance, and they contribute large quantities of runoff water and sediment to further aggravate downstream flood-control problems.

In the fall of 1956, a cooperative research project was set up to study highway erosion-control problems and work out solutions for the Coosa Watershed of northwest Georgia. The State Highway Board, State Experiment Station, Soil Conservation Service, and Agricultural Research Service cooperated in the study.

With field headquarters at Cartersville, Ga., a number of roadside areas were selected in Bartow, Cobb, and Paulding Counties along the 4-lane U. S. Highway No. 41, which had numerous unprotected cut banks. The unprotected banks ranged from approximately 5 feet to 25 feet in height. The side slopes of the cuts varied from 1:1 to 3:1 with a length of 100 to 1,320 feet.

Three principal types of studies were made or are underway. A greenhouse-fertility survey was made to determine the essential plant food requirements lacking in the soils. Most of the soils exposed in these cuts are typical B and C

horizons of the Cecil, Lloyd, Helena, Madison, and Louisa soils and the C horizon of Louisburg and Talladega. The fertility study revealed a general condition of high acidity, averaging 5 pH, an almost total lack of nitrogen and phosphorous, and an inadequate amount of potash. Southland oats were used as the test crop in the greenhouse-pot experiment. Response to Esminel, a mixture of minor elements was inconclusive. The need for fertilizer and lime was clearly indicated in all cases, except for the sandy Louisburg, which did not respond to lime.

The engineering work consists mainly of the design, fabrication, installation, and operation of Coshocton wheels to measure and sample runoff and soil from highway shoulders, unprotected ditches, and cut slopes.

Three sets of N-2 type, 24-inch diameter wheels were installed at the lower end of the road ditches on Cecil clay soil to collect runoff and soil from unvegetated road cuts and banks. The total runoff area varied from .2 to .4 acres per plot, with bank side slopes of 1:1, 2:1, and 3:1. Heights of cuts varied from 5 feet at the lower end to 25 feet near the upper end, with lengths from 300 to 350 feet. Runoff from the paved highway and the area above the plots was diverted by vegetated dykes or diversion dams.



Sediment collects in the lower end of a bare highway ditch as a result of erosion in the upper end.

Note:—The authors are, respectively, agronomist, agricultural engineer, and soil conservationist, Agricultural Research Service, Cartersville, Ga.

All runoff and soil losses, which flowed through the H-flume of the Coshocton wheel, were fractionated and piped to a 400-gallon storage tank. There a water-stage recorder also measured the runoff from each installation. Representative samples were collected from the tank and the flume and used for calculating soil and water losses in tons per acre. Rainfall measurements were made with recording gauge at each location.

Due to variations in highway ditch grades, scouring may occur in some instances and deposition in others. Therefore, on two plots, five rows of metal pins were installed as reference points to determine the extent of erosion or sedimentation. Measurements were made at 1-foot intervals between the squares of pins and across the diagonals at the time of installation. Annual measurements will be made from the two rows of pins in the flow channel and from the row approximately 3 feet above the channel. Deposition found from these measurements, plus the soil collected from the Coshocton wheels, will give the total soil losses from the unprotected roadside cuts.

After a 5-year study of the soil and water losses on the unprotected cuts and ditches, these areas will be planted with the most promising vegetative cover and the study continued.

During the first year 21 plant species were used in the vegetative cover studies. These were planted on different soil types with different exposures; on banks ranging in height from 4 feet to 25 feet, with slopes varying from 4:1, up to as steep as 1½ to 1. Both annual and perennial grasses were used. Some were cool-season while others were warm-season plants. Also included were viney-type plants for steep and rugged areas. All species were fertilized uniformly with 1-ton of 4-12-12, 2-tons of marble dust, and 5-tons of chicken manure per acre. All species were planted with and without mulch.

On a few areas mulches and fertilizers were applied without seeding. These treatments were made to determine the possibility of developing cover from native plants existing on the roadside areas.

Fescue, Oklahoma brome grass, and orchardgrass of the cooler season perennial grasses proved to be best and ranked in importance as listed. All of these grasses remained green



Bermudagrass in the foreground with Bahiagrass in the background stabilize a highway bank.

throughout the summer, except during the worst part of the drought. Fescue in most instances had a good stand and produced excellent cover by the end of the first growing season. Brome grass was perhaps a little more resistant to drought than the other two and thickened up better than either orchardgrass or fescue, as a result of volunteer seedlings. Orchardgrass appeared to be less resistant to drought and more susceptible to disease.

Of the perennial summer-growing species, common bermudagrass and weeping lovegrass gave the best results. Bermuda, in most cases, had a good stand and the few plantings with a



The well-covered bank in the left foreground was planted to fescue after mulching. The partially bare bank in the background was planted to fescue at the same time, but without mulching.

partial stand soon spread and developed into thick sods. Weeping lovegrass is a bunch grass; therefore, it did not thicken up like bermuda. In the older plantings of lovegrass the base of the bunches eroded, which caused the plants to stool and die. Lovegrass was the easiest plant of all to develop a stand and quick cover.

The Bahiagrasses were slow in developing covers for the banks, and their seed drifted or floated downslope worse than any of the other species tested. Rye, a winter annual, and browntop millet, a summer annual, proved to be valuable for developing cover quickly in season, and they left a mulch on which to seed perennials. Browntop millet attracted wildlife when planted adjacent to desirable cover. English ivy and daylilies were used as ornamentals to a limited extent in public areas adjacent to homesites, schools, and churches.

Many sites studied on road banks were several years old. Numerous plants like broom-sedge, common lespedeza, trailing perennial lespedezas, and beggarweed were found. Several such areas were fertilized and mulched without seeding, and a protective cover resulted by the end of the first growing season. This suggests

that many miles of highway banks may be stabilized and covered quickly and cheaply by fertilizing the native species already in such areas.

Mulch applied in correct amounts helped secure uniform stands. The soil under mulch remained moist longer than unmulched soil. This aided germination of the planted grasses. Benefits derived from mulch varied with slope of bank, species, and planting date. On 1:1 steep slopes mulch was essential to anchor seed and prevent them from drifting downslope. Round seed, like vetch and clover, drifted worse than long seed like ryegrass. Mulch reduced damage from frost to late seedings and improved the growth of plants, particularly on steep areas. Plants had better color and vigor on mulched plots as compared with those without mulch. Mulch also aided in the retention of fertilizer uniformly over a plot. But all species tried were successfully established on slopes 2:1 or less without the use of mulch when seeded on the proper date.

Preparation of the soil was not too difficult on slopes 2:1 or less. On slopes steeper than 2:1 preparation of the soil was difficult due to the drifting of loosened soil downhill.

Utility Company Promotes Conservation

By LOUIS B. EARLE

ATTRACTIVE red and white signs may be seen at the entrance to 283 farms in Sedgwick County, Kans. The signs announce: "KG&E AWARD For Completed SOIL AND WATER CONSERVATION."

The signs are furnished by the Kansas Gas and Electric Company, and are proudly displayed by the farmers who have earned the right to display them.

Several years ago the board of supervisors of the Sedgwick County Soil Conservation Dis-

trict was searching for ways to encourage a more rapid spread of conservation practices. The supervisors decided that attractive signs would help by pointing out those progressive farmers who had good conservation programs. The Kansas Gas and Electric Company agreed to cooperate with the district in this advertising campaign.

Now this gas and electric company stages an award banquet each year, to which all awardees are sent a written invitation. The list of awardees is supplied the company by the district supervisors. Both landowners and tenants

Note:—The author is work unit conservationist, Soil Conservation Service, Wichita, Kans.



Rodger Lemon, chairman of the board of supervisors of the Sedgwick County Soil Conservation District, speaks to the guests at the 1958 KG&E Awards Banquet.

are invited to the banquet, along with their wives. This banquet is quite an affair, since many prominent businessmen as well as conservationists are invited. All award winners are listed on the banquet program. The award itself consists only of a post and the attractive sign. Yet, it is much sought after by cooperators of the Sedgwick County district.

To qualify for an award a farmer must be a cooperator with the Sedgwick County Soil Conservation District; he must own or operate a farm of 80 acres or more; and, he must have applied all of the essential soil- and water-conservation practices to the land and must be maintaining them. In other words, all the land must be used according to its capability and treated according to its needs for continued long-time production.

An owner or operator can win an award for each farm he owns or operates.

At the awards banquet on March 1, 1956, 175 farms received the award. At the 1957 banquet, 55 farms received the award, while 53 farms were so honored in 1958.

The district supervisors are well satisfied with the program. People in some other counties in Kansas wish they had such a program. Many farmers ask both SCS technicians and district supervisors, "How do I get one of those red and white signs?"

When they are told how, many farmers go

ahead and complete all their necessary soil- and water-conservation work.

KG&E has offered the same program in all counties they serve. One of these is Crawford County, Kans., which started the program in the spring of 1958 with 17 farms being honored.

"These 283 red and white signs on Sedgwick County farms are a constant reminder to the 2,800 other farm owners and operators in the



Otto Beuke (right) and SCS technician look at the award sign displayed at the entrance to Mr. Beuke's farm.

county that they are still losing too much water and too much soil and had better get busy," said Roger Lemon, chairman of the district board of supervisors.

"We look to the time when we can read on every farm in the county the words KG&E Award For Completed Soil And Water Conservation," he added.

Gordan Evans, president of KG&E says: "Why is KG&E interested in soil and water conservation? In our widespread electric company operations we can see the importance, not only to the individual farmer in following a program of soil and water conservation, but we can notice the effect it has on the urban economy where these practices bring about a healthy and prosperous rural economy.

"Industrial development, quite often is tied in to natural resources and farm products.

"The largest part of a farmer's "plant" is, of course, in his land, and this farm plant must be maintained if adequate production on the farm is to continue. If conservation practices are not followed, then the fertility of the land can and will be reduced by every hard rain or heavy windstorm.

"In the past, business leaders have not shown enough interest in soil and water conservation. They failed to realize how it affected them and our whole economy. Now more and more business leaders are beginning to realize that this problem needs the help of all to solve, and further, that it is not only a local problem but it is one of regional and national significance."



"CONSERVATION ADVENTURES With Dick and Debbie" proved fascinating to eighth-graders (left), David Atwood, Joan Woods, and Brenda Baker at the Center Rutland School, Vt. The 24-page, picture-booklet was designed especially for youngsters by the State Association of Soil Conservation Districts and made available to all public and parochial schools in the Green Mountain State. Teachers have used it to introduce conservation in grades 4 through 8. Center Rutland's principal, Miss Ann Riley, commented: "It's easy to read and the pictures are very

interesting."

Grass Helps Papermakers

Grass Stabilizes Canal Banks, Greatly Reduces Canal Maintenance, and Insures Purer Water for a Paper Manufacturer.

By LEON J. SISK

PAPER is now just a little bit cheaper at Georgetown, S. C. as a result of a few days work done in 1955 by W. M. Steedly, work unit conservationist of SCS at Georgetown.

Steedly, working in cooperation with International Paper engineers, helped develop a plan for seeding the banks of the company's water supply canal that is saving the company \$50,000 a year.

Twenty-five million gallons of water per day are required to produce International's Georgetown mill's daily output of 1,800 tons of paper. The water is obtained from the Pee Dee River, 27 miles north of Georgetown. At the Pee Dee the water is lifted by two 100-horsepower pumps and dumped into a canal where it flows by gravity for 17 miles to the Black River.

There the water is piped under the river to another pumping station where 2 electric pumps lift it into a 45-acre reservoir at the rate of 34,000 gallons per minute. From the reservoir the water again flows by gravity through a canal to a third pumping station at the city limits of Georgetown. From there the water is piped to the paper mill on the Sampit River, a mile away.

Until 1954, water was obtained from the Black River. That year drought lowered the flow of the river, and hurricane tides drove so much salt water up the river the plant processes were seriously disrupted by the salt water.

It takes not only large quantities of water to produce sulphate paper, it takes pure water. Even a relatively small amount of salt or acids in the water renders it unfit for making pulp and paper, and this may result in extensive damage to the paper-making machinery, which represents a capital investment of millions of dollars.

Consequently, when the water from Black River repeatedly tested high in salinity, plant officials began looking for a new source of water. Investigations revealed the only reliable source for the Georgetown mill to be the Pee Dee, about 27 miles away.

Rights-of-way were obtained and work started on the canal. One and a half million cubic yards of earth were moved in its construction. The canal averages 10 feet in width at the bottom, with an average top width of 40 feet. The sides have a 2 to 1 slope. The water flow is approximately 7 feet deep.

While banks with this slope are not especially susceptible to erosion, a considerable amount of soil was being washed off the banks into the canal. There were reasons for this. One was the type of soil—generally sandy—through which the canal was dug. Also the hydrostatic head of water in the soil produced a flow of water laterally into the canal, which carried with it a certain amount of soil.

As a result, the plant was forced to put draglines into operation, dredging the canal at a cost of approximately \$60,000 a year.



Bermudagrass stabilizes the banks of the International Paper Company canal near Georgetown, S. C.

Note:—The author is information specialist, Soil Conservation Service, Spartanburg, S. C.



Mill yard of the International Paper Company at Georgetown, S. C.

In the spring of 1955, Steedly had occasion to consult with company officials about a matter concerning some of their other land. During the discussion, Steedly mentioned the canal and asked if the planting of grass to hold the soil on the sloping canal banks had been considered. While some thought had been given to erosion control, it hadn't occurred to them that such service and know-how was available from the Soil Conservation Service. They got in touch with the supervisors of the Georgetown Soil Conservation District immediately, discussed the matter with them, and asked for help with the project. The district in turn requested Steedly to work with the company engineers on the problem.

To make a long story short, the canal banks were seeded with a mixture of grasses including Bahia and bermudagrass, as well as winter ryegrass. About 500 acres of grass have been established. The grass has reduced bank erosion to such an extent that one dragline operating only part-time keeps the canal free of silt. This has resulted in reducing maintenance costs by approximately \$50,000 annually.

Company officials at International are delighted with results. In addition to the reduction of maintenance costs, the verdant banks of the canal add beauty to the countryside, which is good for public relations.

Furthermore, the canal serves as an excellent demonstration for farmers in the Georgetown District of how they can handle the drainage ditches on their own farms. Steedly pointed out that a uniform sod of grass on farm ditch-banks will do just as good a job for smaller landowners as it is doing for International Paper. Besides making maintenance easier, it will help with weed and brush control. With 453 miles of drainage ditches on farms in the Georgetown District, the savings thus effected would be no small item.

TREES ARE A CROP.—The Soil Conservation Service recognizes that trees are a crop, and accordingly encourages the planting, protection, and proper care of trees where the land capability shows that to be the most suitable use for the sustained productivity of the land.

D. A. WILLIAMS, *Administrator,*
Soil Conservation Service

FERTILIZER PAYS ON RICH SOIL.—Some fertilizer tests at the University of Minnesota show that fertilizing may pay, even on highly productive soils. Proper fertilization boosted corn yields from 138 bushels to 159 bushels per acre. Fertilizer cost was \$12 and yield increase was about \$25 per acre, resulting in a net gain of \$13 per acre.

Nature Was Too Slow

A Washington Rancher Found It Profitable To Plant Adapted Grasses and Legumes on Bare Land Because Natural Revegetation Was Too Slow.

By BERNARD M. OTNESS

NATURAL revegetation of denuded range-land in a dry climate is uneconomical because it is too slow, in the opinion of Frank Lenzie, a cooperator with the West Benton Soil Conservation District in south-central Washington. He urges that all bare rangeland, especially that which is being retired from cultivation, be planted to adapted grasses and legumes at the earliest opportunity.

Mr. Lenzie operates a 26,000 acre ranch in the Horse Heaven Hills country south of Prosser, Wash. About 6,400 acres are cultivated with a wheat-summer fallow rotation. The remainder is grazing land. The ranch was acquired in 1935, but Lenzie did not assume full management of it until 1947. For the 30 years before that, he was with the Forest Service and Indian Service of the U. S. Government as a range specialist.

During World War II the livestock were sold, and the ranch was turned over to the Navy as a part of a gunnery range. During this interval extensive burns denuded the land of vegetation in several places. Soil blowing became severe in some of the burned areas, and sand dunes formed in places.

In addition to the burned-over areas, the ranch has several fields that were formerly cropped but were retired from cultivation. Most of this formerly cultivated land had only a sparse stand of desirable grasses on it, even though some of it had not been cultivated for 30 years.

It is mainly this abandoned cropland and the burned-over areas on which Mr. Lenzie has been working to reestablished a good stand of desirable grasses.

One field of particular interest on the ranch is pointed out by Mr. Lenzie. This field cultivated and cropped to wheat over 30 years ago was abandoned and not reseeded to grass. The field has been grazed in conjunction with the adjacent native range since that time. One might think that the natural spreading of native bunchgrass seed would have revegetated the area by now. But the sparse stand established and the preponderance of undesirable vegetation attests to the fact that from the economic stand-point nature was just too slow.

Examination of the abandoned, formerly cultivated field shows a composition of sagebrush, wild flax, fleabane, plantain, rabbitbrush, annual bromes and fescues, a small amount of Indian ricegrass, and needle-and-threadgrass. Only a sparse stand of the most desirable native forage species, beardless wheatgrass, is present, and that is only in limited locations. The undisturbed rangeland adjacent to this field has an excellent stand of beardless wheatgrass with very little of the undesirable plants.

On the formerly cultivated field at least 7 acres are required to produce a month's feed for a cow. The native range, because of the



Frank Lenzie stands in a native pasture that has never been cultivated. In the background is an area that was retired from cultivation about 30 years ago. This plot is still covered mainly with sagebrush and inferior grasses.

Note.—The author is work unit conservationist, Soil Conservation Service, Prosser, Wash.



Sand dune on the Lenzie ranch that has been controlled by planting yellow wild ryegrass.

desirable vegetation, will produce a like amount of feed on 3 acres. This, says Mr. Lenzie, bears out the need for seeding abandoned fields to adapted perennial grasses. The best time to make this seeding, he continues, is the year of abandonment, so as to take advantage of a relatively weed-clean seedbed and stubble that will assist in controlling wind erosion.

In speaking of grasses to plant, Mr. Lenzie points out that the grass must be adapted to the soil texture, climate, and general site. He has had particularly good results spot planting

yellow wildrye (*Elymus flavescens*) on sand dunes, the original seed of which was gathered from a dune area several miles distant. He started planting the seed on the dune areas in 1950, and he plans to continue doing so until all dunes have been stabilized.

Another good sand-stilling grass he finds well adapted to the Horse Heaven area is thickspike wheatgrass (*Agropyron dasystachyum*). This grass is doing an excellent conservation job by protecting sandy soils from blowing. Without this protection the finer particles in the soil would be blown away leaving the coarser sand that might grow into problem dunes.

Because of the mounting problem of reestablishing a ranching operation after the war, Mr. Lenzie resigned from the Indian Service in 1947. He and his wife, Ethel, moved directly to the ranch and started anew the development of a sheep and cattle operation in the country that interested them the most.

By careful selection of breeding stock and the use of registered Hereford bulls they now have a well-rounded ranching enterprise. Seven wells that serve 6 large fenced pastures have been developed. Approximately 80 acres of sand dunes have been spot-seeded to sand-stilling grasses; and, 44 miles of fence have been constructed. The extra water places and fences enable Lenzie to control his livestock, rotate and defer grazing, and put into effect a long-range plan to increase the desirable vegetative cover. Livestock now can get to water from any place on the ranch by walking less than 1 3/4 miles. As an additional precaution, critical blow areas are fenced to exclude grazing.

The Lenzies have a keen awareness of the conservation responsibility entailed in the management of 26,000 acres of land. Holding past gains and planning for future ranch improvements requires constant attention. They find that low annual precipitation, which averages just over 7 inches, precludes any quick conservation gains. Careful planning, giving full consideration to nature's limitations, is necessary. The conservation job is not yet completed but the goal is in view now that son-in-law, Arthur Berg, and his teen-age sons, Frank and Barney, have moved to the ranch.



Mr. Lenzie stands near a three-pasture watering arrangement.

Saving The Seepage

By MORRIS B. SIMPERS

NOT enough irrigation water! That was the problem confronted by water users of the Hill irrigation ditch in southeastern Wyoming 2 years ago.

Cooperators with the North Platte Valley Soil Conservation District, in which the ditch is located, decided to do something about this. Doing the work themselves, with the technical assistance of the Soil Conservation Service, the water users have modernized their irrigation ditch. The project now has been in use for two seasons. Results have been so successful that additional improvements are planned.

"The water has not been turned out of the ditch during the irrigation season to remove weeds and moss, and every farmer has received his full allotment of water for the last two seasons," reports Howard Hood, who is the last man on the ditch to receive water.

The problem faced by the water users in the

Note:—The author is area conservationist, Soil Conservation Service, Torrington, Wyo.



Installing concrete lining with a slipform in the Hill irrigation ditch.

spring of 1956 was a serious one. A section of the canal approximately 3,000 feet long is built on a fill. The area is very sandy and erodes readily, which has resulted in the fill section becoming almost level. The water flowed so slowly that weeds and moss clogged the ditch. This made it necessary to shut off the water while the weeds and moss were cleaned out during the height of the irrigation season. Water loss through seepage was heavy, and several times breaks in the ditch were caused from rodent damage.

Walter Schumacher, a supervisor of the North Platte Valley Soil Conservation District and a Hill Ditch water user, and Frank Berry, another water user, were determined to correct their ditch problem in the spring of 1956. They



Irrigation water is delivered to the end of the line without loss from seepage or interruptions to clean out weeds and rubbish.

requested technical assistance of the SCS technicians assisting their district.

Then they learned from the Agricultural Stabilization and Conservation Committee of Goshen County that organized irrigation districts are not eligible for cost-sharing payments. However, they found that a group of individuals on a voluntary basis were eligible. Schumacher and Berry got other water users to agree voluntarily to finance the farmers' share of the cost of modernizing the irrigation ditch.

Soil Conservation Service engineers planned the project. This called for filling the old canal, eliminating one 4-foot drop structure, building a new grade, and constructing a new canal, of which 3,900 feet would be lined with concrete.

When the grade was completed, ditches were plowed and water turned in to soak the grade for 48 hours. The new ditch was made with a large ditcher pulled by two farm tractors. A road grader was used to blade away the loose dirt.

Supervisors of the North Platte Valley Soil Conservation District purchased a large steel slipform, and rented it to the Hill Ditch water users to do the concrete lining job. The form had to be remodeled to pour a 4-inch concrete lining as had been planned. Ready-mix concrete was obtained locally, and 750 cubic yards were used to line the 3,900 feet of ditch. The finished ditch is 24 inches wide at the bottom, 42 inches deep, and has 1½ to 1 side slopes.

The Hill Ditch water users now are so well pleased with the results of this job that they plan to concrete-line other sections of the canal.

Permanent Farm Roads

By ROY R. BECK

FARMERS in western North Carolina's Haywood Soil Conservation District have found it pays to make their roads permanent farm improvements.

They are doing this by building roads properly and then seeding them to grass. Such roads are valuable as access roads for fighting forest fires, for trucking out wood cut during woodland-management operations, and for hauling lime and fertilizer to hillside pastures.

Wildlife, especially deer and turkey, benefit from the grasses growing on stabilized roads in wooded areas. In fact, when roads are spaced closer than 1,000 feet, the grassed areas of such roads adds up to about 2 percent of the area, which is considered practical for wildlife management. Some pulpwood operators are spacing their roads as close as 500 feet apart.

How valuable is a farm road? In Haywood County, the soil conservation district supervisors estimate farm roads cost an average of \$425 a mile to build. Landowners and wood-



Gully caused by poor construction and maintenance of a farm road in Haywood County, N. C.

using industries spent almost \$100,000 building roads in Haywood County during 1956.

Yet many temporary farm roads have been bulldozed out during the past few years with no thought of their ever being used again. Badly rutted and abandoned after a year or two, they become impassible gullies, creating serious problems on hillside pastures and in woods.

Haywood district supervisors, with the help of agricultural workers, contractors, and men from wood-using industries, developed these



Properly constructed and grassed farm-access road that has withstood 3 years of use without deterioration.

Note:—The author is work unit conservationist, Soil Conservation Service, Waynesville, N. C.

recommendations for building and maintaining farm roads: (1) Have road surveyed before construction. (2) Keep grades under 10 percent. (3) Avoid dips where water can collect. (4) Slope roadbed out from hillside 6 to 8 inches. (5) Have minimum turning radius of 35 feet on cutbacks. (6) Do not build roads close by and parallel to stream channels. Such roads act as diversions for the whole hillside and soon wash out. (7) Build water-turnout cross ditches on diagonal to increase ditch grade for self-cleaning. (8) Space cross ditches no farther apart than: 300 feet for grades up to 5 percent, 100 feet on grades of 5 to 10 percent, or 50 feet if road grade has to be over 10 percent.



A cross ditch, supported by locust poles, on a farm logging and pasture road that has given satisfactory service for 4 years.

Grass seeding recommendations include: (1) Apply 2 tons of lime per acre. (2) Prepare seedbed by dragging with harrow or other suitable equipment. (3) Apply 800 pounds of 8-8-8 fertilizer per acre. (4) Seed 20 pounds of Ky. 31 fescue and 1 pound of inoculated white clover seed per acre. (5) Seed 2 bushels of rye on fall seeding or oats on spring seeding. (6) Mulch roadbanks with pine boughs or other material.

WORLD POPULATION.—The population of the world may rise to 4 billion or more by 1980 and to 6 or 7 billion by the end of the century, according to a new United Nations study on future population trends.

The Main Crop Is Quail

By J. B. EARLE

QUAIL is one of the main crops on the Okeetee Plantation near Ridgeland, S. C. There are more than 1,000 bicolor lespedeza strips on this 60,000 acre plantation, each about one-eighth acre in size. The strips are located and laid out according to a definite pattern and plan. The main purpose of the bicolor is to furnish quail food.

Rice, beef cattle, horses, trees, and ducks are also provided for on this plantation; but, the quail crop takes second place to none.

Technicians of the Soil Conservation Service, cooperating with the Beaufort-Jasper Soil Conservation District, helped the plantation owners develop a conservation plan, after a soil survey had been completed. W. W. Neely, SCS biologist, took a prominent part in working out the plan, because the plantation owners wished to stress wildlife conservation as well as wise use of the soil and water resources.

Some land in capability class III-w was too wet to grow crops, yet not wet enough for ducks. SCS technicians helped lay out a drainage system for this land, and it is now planted to bicolor lespedeza and other feed crops for quail.

But ducks are also provided for at Okeetee. Dikes, ditches, and water-control structures

Note:—The author is assistant State conservationist, Soil Conservation Service, Columbia, S. C.



One of the more than 1,000 bicolor lespedeza strips on the Okeetee Plantation.

have been installed to make rice growing feasible on some of the nearly level land. After the rice is harvested, with a combine, enough grain is left on the ground to provide a great deal of duck food. Mr. Frank E. Baldwin, Jr., who leases 120 acres of the plantation for rice growing, estimates that his combine leaves at least 5 percent of the rice on the ground.

Lease arrangements formerly required that one-fourth of the rice crop be left for the ducks and not be harvested. But, it was found from studies and observations that there is probably more food for ducks when the entire ricefield is combined. Those seeds left after combining fall to the ground and are eaten by ducks. Whereas, that rice not combined is eaten mainly by bobolinks (ricebirds), and blackbirds.

After the rice is harvested the field is flooded. Water is provided from a well, 300 feet deep. A 25 horsepower electric pump is used to lift the water from the well to a reservoir at the rate of about 1,600 gallons per minute. The water flows from the reservoir to the rice fields by gravity.

The rice is planted from March 15 to April 15. It is harvested from August to October. In some cases, when the rice is harvested early and the fall is late, a second growth will produce another crop of rice which is left for the ducks.

Even though timber is secondary to quail on this farm, pines are not overlooked in the farm plan. The woods are divided into blocks. A systematic cutting plan is followed with a con-



Ricefield on the Okeetee Plantation.

sultant-forester marking the trees to be cut. Some thinning is done each year.

N. B. Bass, superintendent of the plantation, has a small herd of beef cattle which are provided with almost year-round pasture. A herd of riding horses are also kept, mainly to be used in quail hunting.

DISTRICT PROFILE

CLAYTON
HEALEY
of
MICHIGAN

ONE of the goals of Clayton Healey, chairman of the Charlevoix Soil Conservation District in Michigan, is to get all farmland assessed according to land capabilities. This method of tax assessment was outlined in the 1956 Michigan tax manual and was the springboard for district action. This district felt that the tax assessment of many areas in Michigan was erratic and, believing that assessment of land according to capability was the soundest method of appraisal of land, immediately adopted it as one of their projects.

On behalf of the district, Clayton has worked on this project since 1956. He was instrumental in getting together necessary research data and meeting with interested groups to encourage acceptance of the program. Recently, Marion Township accepted the method on a trial basis.

Clayton contends that this assessment program does not mean an increase in taxation but a system of equalizing the tax burden. The soil surveys of the Soil Conservation Service can be used as the main base on which tax assessment of land is founded. Consideration is also given to distance from market, economics, and crops grown in the area.

Healey has the first basic soil conservation plan in the district. He has been a district director since the Charlevoix Soil Conservation District was organized in 1948 and has been chairman of the district for the past 9 years.

This 42-year old farmer was operator-manager of the Healey Dairy for 14 years until selling out in 1955 to devote his entire time to his 300-acre farm. At present this farm, plus



Clayton Healey

100 acres that he rents, supports a 60-head commercial beef cow and calf enterprise as well as 31 milking cows and replacements. The farm also has an 11-acre cherry orchard.

His basic farm plan calls for a 5-year crop rotation along with rotational grazing of pasture. In addition, a variety of soil conservation practices have been established on the farm—contour strips, diversions, waterways, tree plantation of red and white pine, multiflora rose plantings, and windbreaks. Clayton states the diversions he established back in 1949 saved the orchard from severe erosion, and the grass waterway was a must for the outlet of the excess water from the diversion. The contour strips have held erosion to a minimum on his most intensely cultivated cropland.

Once a barren hillside, the plantation of red and white pine has put on excellent growth and has created an ideal habitat for wildlife. Proper management of this plantation calls for thinning, and in the process Clayton has harvested a few Christmas trees.

He has seeded a mixture of ladino, alsike, brome, and timothy in his lowland areas where adapted. This mixture plus a well-balanced fertility program has resulted in better quality and quantity of pasture for his livestock.

The results of all these practices have greatly

encouraged neighborhood participation in the district program.

Clayton isn't alone in practicing and teaching conservation. Agnes, his wife, has been active in the Women's Auxiliary of Soil Conservation Districts Association. Both Mr. and Mrs. Healey evaluate the present situation but look to the future as well for their three children. His goal is to leave the farm in a better condition than when he started farming so that his children may continue to carry on the farm enterprise.

Healey believes an essential part of the district's program is the cooperation of the district with local, State, and Federal agencies. Evidence of this can be seen in the soil- and water-conservation projects in the schools in cooperation with the Parent Teachers Association and the Michigan Education Association. District dealer relationships have recently spurred a program of free soil tests that will aid any landowner in applying the correct fertilizer. The district has cooperated with the East Jordan Future Farmers of America and East Jordan Advisory Council in establishing soil-runoff plots for educational purposes.

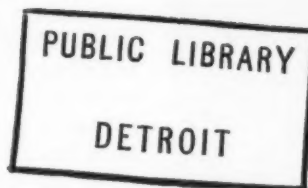
Healey has assumed statewide responsibility in the districts program. He has been regional director of the State Association of Soil Conservation Districts for 6 years, and has burned plenty of midnight oil, in attending other directors' meetings, giving them advice and information.

Besides his duties as director he is an active member of East Jordan school board, honorary member of the East Jordan Future Farmers of America, member of the Agricultural Stabilization and Conservation Committee, and member of the Forestry Committee of East Jordan High School.

—BILL GRIMM



LEARNING ABOUT SOIL AND WATER CONSERVATION. By Adrian C. Fox and George E. Rotter. 64 pp. Illustrated. 1958. Lincoln, Nebr.: Johnsen Publishing Co. 75¢.



THE authors call this "A text-workbook for use in social studies or language arts, grades 5 to 8." That seems to be a good description of the book, and it is probably the best book of this kind on conservation that has ever been placed on the market.

The first part of the book is written in story form, yet is packed with useful information about soil and water and their conservation. The latter part is a workbook aimed at encouraging students to think and write about conservation.

The illustrations, both photographs and cartoons, are excellent. The subject matter is sound, since it was prepared by a conservationist and an educator. The story is delightful. This should be a best seller in schools where conservation is taught by integration into social studies and language arts.

—TOM DALE

COTTON. By Harry B. Brown and Jacob O. Ward. 566 pp. 3rd Edition. Illustrated. 1958. New York: McGraw-Hill Book Co. \$12.00.

ONE but has to read the list of references at the end of each chapter to recognize that the authors have incorporated the latest information in this edition. In recent years, considerable advancements have been made in the culture, mechanization, improvement of varieties, and the processing of cotton. This edition has dealt with these aspects very well.

The organization of this edition is much the same as the previous editions. However, some rearrangements have been made to improve the general plan. Specialists in the various phases of cotton production, marketing, and process-

ing contributed in the preparation of their particular specialties.

This is a good reference and text for colleges, and specialists in colleges and industry, who are interested in all the aspects of cotton.

—B. D. BLAKELY

FREE FISHING RIGHTS.—Finley Creek provides the municipal water supply for the city of LaFayette, Ala. The local work unit conservationist and district supervisor worked closely with the city officials in locating this water supply in the Finley Creek Watershed. Service engineers collaborated with the city engineer in planning and constructing the dam for impounding the water supply. The district supervisors and the work unit conservationist enlisted practically every landowner in the watershed as a district cooperator, and the work unit conservationist has helped prepare basic farm plans for almost every farm in the watershed.

Recently the mayor of LaFayette expressed his appreciation to the conservation farmers of the watershed with the following letter:

The city of LaFayette deeply appreciates your cooperating with the Finley Creek Watershed Project and commends you for the soil conservation you have done in the past. We would like to encourage your continued cooperation with the Piedmont Soil Conservation District in the practice of good soil conservation.

As a token of our appreciation we are happy to give you this permit which entitles you and your immediate family to fish in the city lake.

Sincerely yours,
CITY OF LAFAYETTE
H. D. Huguley, Mayor

P. S. This letter is your permit. Be prepared to present it to the game warden or city officials upon request.

MORE FARM TELEPHONES.—An annual survey by USDA's Crop Reporting Board shows 2,684,000 farms in the U. S. with telephone service in 1957. This is an increase of 70 percent since 1940, 24 percent since 1950, and 6 percent since 1955.